

REMARKS

Reexamination of the captioned application is respectfully requested.

A. SUMMARY OF THIS AMENDMENT

By the current amendment, Applicant basically:

1. Amends the specification to update the status of three incorporated applications (now issued as US patents).
2. Thanks the Examiner for the allowance of claims 65-66, and the indication of allowable subject matter in claims 11, 12, 18, 19, 24, 25, 30, 31, 46, 47, 53, 54 and 56.
3. Amends claims 1 - 7, 10 - 14, 17 - 18, 20, 36 - 42, 46 - 49, 52 - 53, 55, 57 - 66 (see Section B infra).
4. Adds new claims 67 - 93 (see Section C infra)
5. Cancels claims 22 - 35 without prejudice or disclaimer.
6. Respectfully traverses all prior art rejections (see Section D infra).
7. Respectfully requests an office interview (see Section E infra).

B. AMENDMENTS TO THE CLAIMS

Independent claim 1 has been amended so that its preamble (like its body) refers entirely to a user equipment. Claims 2 - 5, 11, 12, and 57 - 58 are UE claims dependent upon independent claim 1 and now have their preambles amended consistently with independent claim 1.

Dependent claim 6, which previously introduced certain "network" operations, has been rewritten as an independent claim directed to a telecommunications network in which a UE (have capabilities such as those of independent claim 1) operates. Claims 7 - 10 and 13 - 21 depend from new independent claim 6.

Like independent apparatus claim 1, independent method claim 36 has now been recast as a method of operating a user equipment unit. Claims 37 - 40, 45 - 46, and 63 - 64 depend from independent claim 36.

In like manner as claim 6, method claim 41 has been rewritten as an independent method claim directed to a telecommunications network in which a UE (have capabilities such as those of independent claim 1) operates. Claims 42 - 45 and 48 - 56 depend from new independent claim 6.

Claims 1 and 6 have been amended to specify that the user equipment unit can switch to the virtual active set of plural base stations upon performance of an inter-frequency handoff (the underlined phrase essentially replacing the former phrase "when the measurement made at the user equipment unit so warrants"). Support resides throughout the original disclosure, including page 5, line 15 and lines 26 - 27; page 6, first two paragraphs; page 7, line 21; page 13, lines 27 - 31. The phrase "when the measurement made at the user equipment unit so warrants" has been deleted from other claims, including allowable independent claim 65.

The appositive "(UE)" has been deleted from all claims which previously contained the same.

C. THE NEW CLAIMS

Support for new independent claim 67 resides in original independent claim 1, with new independent claim 67 resembling amended independent claim 1 in many respects. That the virtual active set plural base stations satisfy network-specified criteria¹

¹ In terms of satisfying network-specified criteria, both the first mode (wherein the network, having determined that the criteria is satisfied, authorizes the user equipment unit to report) and the second mode (wherein the network authorizes the user equipment unit to perform virtual active set updates when the criteria is met) are encompassed.

is supported, e.g., by page 23, lines 5+, as well as page 6, lines 19 - 24; page 14, lines 9+ page 15, lines 16 - 20; and page 20, lines 7+. That the virtual active set can essentially immediately be utilized as the active set for the user equipment is supported, e.g., by page 5, line 20 and line 25; page 7, line 21; page 14, lines 26 - 30; page 15, lines 12 - 15; page 38, lines 5 - 7; and page 38, lines 24 - 26. That after the inter-frequency handover the user equipment unit is in radio communication with each of the plural base stations in the virtual active set is supported, e.g., by page 15, lines 12 - 15; page 3, lines 25 - 27, and page 38, lines 5 - 7.

New dependent claims 68 - 87 essentially correspond to pending claims 2 - 87, respectively.

In new independent claim 88, the user equipment unit performs measurements respecting (1) signals of a second frequency from each of plural base stations which operate on the second frequency and (2) signals of a third frequency from each of plural base stations which operate on the third frequency; and maintains (1) as a first virtual active set plural base stations which operate on the second frequency and which satisfy network-specified criteria and (2) as a second virtual active set plural base stations which operate on the third frequency and which satisfy the network-specified criteria; so that when an inter-frequency handover is required one of the first virtual active set and the second active set can essentially immediately be utilized as the active set for the user equipment. *See*, for example, Fig. 3 (which discloses two virtual active sets) and the description thereof for support.

New dependent claims 89 -91 resemble claims 13 - 15, respectively.

New dependent claim 92 and 93, like new dependent claim 84, correspond to existing dependent claims 18 and 53, but do not contain Equation 1 in its entirety.

Rather, new claims 92 and 93, which ultimately depend from claims 6 and 41, respectively, concern parameters upon which the frequency quality estimate is dependent.

D. PATENTABILITY OF THE CLAIMS

Claims 1-10, 13-17, 20, 22, 23, 26, 28, 29, 32, 34-45, 48-52 and 55 stand rejected under 35 USC §103(a) as being unpatentable over U.S. Patent 5,848,063 to Weaver Jr. et al and further in view of U.S. Patent 6,097,954 to Kumar et al. Claims 21, 27, 33 and 56 stand rejected under 35 USC §103(a) as being unpatentable over U.S. Patent 5,848,063 to Weaver Jr. et al and U.S. Patent 6,097,954 to Kumar et al and further in view of U.S. Patent 6,285,883 to Bringby. All prior art rejections are respectfully traversed for at least the following reasons.

Independent claim 1 typifies all independent claims in requiring that the user equipment unit, while communicating with a telecommunications network using one of a cell or a current active set of base stations on a first frequency, maintain a virtual active set of base stations on a second frequency and perform measurements respecting signals on the second frequency for the respective plural base stations of the virtual active set. The user equipment unit (UE) switch to the virtual active set of base stations upon performance of an inter-frequency handover.

An advantage of Applicant's technique is that, upon completion of the switch and the inter-frequency handover, the user equipment unit has an already-prepared set of pre-qualified base stations on the second frequency with which to operate. That is, upon the switch, the virtual active set immediately becomes the active set. At the switch to the second frequency there is no time lost in trying to determine which second frequency cells quality for use in the (new) active set.

A previous Office Action appeared to interpret the claimed virtual active set as being one of the neighbor set or candidate set of U.S. Patent 5,848,063 to Weaver Jr. et

al. Applicant continues to disagree with this interpretation to the extent that it is still held. Weaver's references to "sets" (whether neighbor, candidate, or active) are entirely in the context of soft handoff. In soft handoff, the base stations are in simultaneous communication with the remote station on the same frequency. Moreover, it only stands to reason that if a base station can migrate from a neighbor set to a candidate set to an active set as described in col. 13, lines 46+, the base station must be on the same frequency as the active set. Therefore, Weaver's neighbor set or candidate set cannot be the claimed virtual active set (since the virtual active set must be on a different frequency from the active set).

Weaver makes reference to an active set only up until time that a determination is made to make a hard handoff. (By the time of a hard handoff, Weaver has totally lost interest in the neighbor set and the candidate set, which are irrelevant for hard handover). The active set really comes into play only because when nearing hard handover, and by examining the membership of the active set, Weaver can sense when a hard handover is eminent. For example, the Active Set contains only one base station, and that base station is a boundary base station (see col. 22, lines 56+).

Weaver's hard handover scenarios (e.g., handover to a new frequency) are triggered essentially in one of two ways. The first way is by pilot signal measurement. As explained above, the Weaver pilot signal-trigger hard handover scenario does not teach or suggest Applicant's claims because the Weaver pilot signal from the new system is on the same frequency as the existing system. Applicant's claims require that the measurements regarding the virtual active set be on a second frequency which differs from the first frequency.

The second way is by measuring the round trip delay (RTD) of the signal from the existing system, and triggering the hard handover if the RTD exceeds a predetermined threshold. Regarding this second way, note that there are no measurements by Weaver

on the frequency of the new system, but rather an automatic switch or hard handover if the RTD exceeds a stored value. This is confirmed by MDHO Table 1 (see cols. 19 and 20) and col. 23, lines 53+. This second way, not involving any frequency measurement of the second system, comes nowhere close to the claims.

Thus, the hard handover scenarios of U.S. Patent 5,848,063 to Weaver Jr. et al do not teach or suggest the subject matter of Applicant's independent claims. As mentioned above and now elaborated, one glaring difference is that when Weaver's mobile unit moves from system S_1 (operating on frequency f_1) to system S_2 (operating on frequency f_2), Weaver detects a pilot beacon P_1 (on frequency f_1 !!!) of system S_2 . In other words, in order to ascertain whether to switch from an existing system with a currently utilized (old) frequency to a new system with a new frequency, Weaver's mobile monitors an old frequency signal emitted from the new system. See, e.g., the discussion of the pilot signal in the first paragraph of column 21, and the discussion of Fig. 14 and Fig. 15 which begins in col. 26 and continues into col. 27². In other words, the remote unit of Weaver does not perform measurements on frequencies operated by base stations other than those of the frequency of the Weaver active set. For this and other reasons, Weaver does not anticipate or provide a basis for denying the patentability of Applicant's claims.

In addition to all said above, Weaver does not switch to a set of plural base stations upon performing a hard handover. Rather, in each of Weaver's hard handover scenarios, Weaver merely switches to a single base station on a new frequency. See, for example, the scenario described in col. 10, lines 15 - 45 (in which there is no indication that other base stations besides base station B_{21} is pre-approved by previous frequency

² Note particularly that as a remote unit traveling in system S_1 toward system S_2 begins to detect the pilot signal from pilot beacon P_1 , and that pilot beacon P_1 is on the frequency F_1 of system S_1 (see paragraph bridging columns 26 and 27). See also col. 8, lines 57 - 59: "the second system may need to be modified to transmit a pilot signal or other CDMA beacon to aid the initiation of the hard handover process. Further, the discussion in col. 24, lines 4 - 30, indicates that the pilot signal from the new system is of the same frequency as the existing system because the second system pilot signal increases interference in the existing system. This is consistent with the illustration of hard handoff involving two frequencies in a CDMA system wherein base station 200 (of Fig. 4C) of the existing system having a pilot signal on frequency f_2 (see col. 24, lines 36 - 37).

measurements). See also col. 12, lines 14 - 17; col. 22, lines 52 - 53; col. 26, lines 36 - 39; noting that the handover is always merely to a base station. More poignantly, see col. 27, lines 1 - 10 wherein the hard handover is described as first involving the base station corresponding to coverage area C_{1B} , and only thereafter as the remote unit continues toward system S_2 is soft handover used to transition communication to the base station for coverage area C_{2B} . What is missing from Weaver in this regard is any indication of having also pre-established -- before the hard handoff -- the base station for coverage area C_{2B} in a set along with the base station for coverage area C_{1B} .

So, not only does Weaver not perform measurements on a second frequency (on which the claimed virtual active set must operate), but also Weaver does not switch to a set of plural base stations (much less the claimed *virtual* active set) upon performance of an inter-frequency handoff.

The Office Action states that Weaver "allows the ability to handoff a user from one cell system to a second, different cell system". In a hard handoff situation Weaver hands off to a cell, but it is not correct to infer that, at the time of inter-frequency handoff, the user equipment unit is in radio contact with a set of cells for which measurements have already been made.

The Office Action acknowledges that Weaver uses pilot signal measurements and not voice channel SNR/RSSI measurements, but appears to suggest that SNR/RSSI measurements would warrant a handoff. But there is simply no teaching or basis of suggestion in Weaver (or any other applied reference) that voice channel SNR/RSSI measurements for a set of base stations operating on a second frequency are monitored or utilized to pre-qualify the base stations to become a virtual active set of base stations upon an inter-frequency handover.

U.S. Patent 6,097,954 to Kumar et al defines active set and neighbor set³, but never uses the term "candidate set" as imputed or presumed by the Office Action. Rather, Kumar uses the sole word "candidate" in the sense of "a candidate base station". In so doing, Kumar uses the "candidate base station" in the sense of a sole target base station in the context of a soft handover. *See, e.g., col. 5, lines 40 - 42: "Note that the base station 26-3 is now a candidate base station, i.e., a base station to which a soft handoff is requested"* (emphasis added). Kumar never speaks of a soft handoff as resulting in a new set of base stations being active base stations. Kumar does not discuss inter-frequency handoff in detail, and accordingly makes no suggestion regarding a new set of active base stations being immediately available upon completion of an inter-frequency handoff.

There is a difference between a candidate base station and candidate set. The term "candidate base station" is usually employed (as in Kumar) in terms of a likely base station which, as a result of a soft handover, may acquire the role of the primary base station. The "candidate set", on the other hand, is a group of base stations whose signals are monitored for the prospect that they may eventually become part of the active set for a remote unit (see col. 13, lines 45+ of Weaver). And, as explained above, moving a base station into a candidate set (e.g., from a neighboring set) is merely a reclassification of base stations which operate on a same frequency for the purpose of supporting the existing active set. This has nothing to do with maintaining a virtual active set of base stations on a second frequency which immediately becomes the active set upon an inter-frequency handoff.

Both the "candidate base station" as in Kumar and the "candidate set" of Weaver are in strict context of soft handover. Neither reference teaches, or forms any basis of

³ In the paragraph bridging cols 3 and 4 Kumar reads as follows: "The active set typically includes a primary base station, i.e., base station in control of call processing for the mobile-telephone, and zero or more secondary base stations, i.e., base stations in communication with the mobile-telephone other than the primary base station. The neighbor set includes base stations that are close and/or adjacent to the primary base station. The primary base station provides the mobile-telephone with a list indicating the base stations in the active set and the neighbor set."

suggesting, switching to a virtual active set of plural base stations as the active set upon performance of an inter-frequency handover.

The tertiary reference, U.S. Patent 6,285,883 to Bringby, is understood to be applied only for its alleged pertinence to hysteresis protection. Applicant reserves the right to defuse in the future any controversy engendered by Bringby. However, in view of the fact that Bringby is not alleged to rectify any of the deficiencies of the primary and secondary references regarding the independent claims, and in view of Applicant's belief that the prior art rejections of the independent claims are manifestly overcome, there appears no need to treat U.S. Patent 6,285,883 to Bringby at this time.

E. REQUEST FOR INTERVIEW

Applicant's attorney requests the opportunity for an office interview prior to the mailing of a first Office Action for this application. The Examiner is respectfully requested to contact the undersigned to arrange for the interview.

F. MISCELLANEOUS

In view of the foregoing and other considerations, all claims are deemed in condition for allowance. A formal indication of allowability is earnestly solicited.

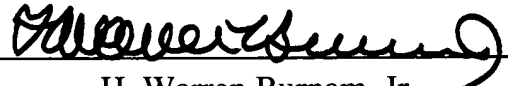
The Commissioner is authorized to charge the undersigned's deposit account #14-1140 in whatever amount is necessary for entry of these papers and the continued pendency of the captioned application.

Should the Examiner feel that an interview with the undersigned would facilitate allowance of this application, the Examiner is encouraged to contact the undersigned.

MULLER
Serial No. 09/545,872

Respectfully submitted,
NIXON & VANDERHYE P.C.

July 7, 2003

By: 
H. Warren Burnam, Jr.
Reg. No. 29,366

HWB:lsh
1100 North Glebe Road, 8th Floor
Arlington, VA 22201-4714
Telephone: (703) 816-4000
Facsimile: (703) 816-4100